Coral Reef Conservation Program

International Strategy

2010 - 2015

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The NOAA Coral Reef Conservation Program would like to thank the CRCP threat-based and international working groups, as well as those who provided input during the public comment period, for their contributions. The commitment, time, and effort brought to this process is greatly appreciated. These goals and objectives will play an integral part in helping chart the future course of the CRCP.

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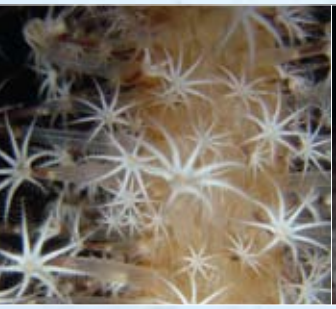



Introduction

Coral reef ecosystems have great economic, social, and cultural importance to communities, businesses and nations around the world. These ecosystems provide a wide range of valuable ecological services, constituting a major food source, economic base, and future hope for sustainable development in many countries, particularly small island nations. Given these important roles of coral reefs across the globe, U.S. efforts to promote healthy coral reefs internationally are critical to U.S. diplomatic and development strategies to promote economic and food security, social stability, democratic governance, improved human health, disaster and climate change mitigation, and biodiversity conservation in many countries.

International efforts to promote healthy, resilient coral reef ecosystems also benefit coral reefs in U.S. waters. Most coral reef ecosystems in U.S. waters are interconnected with, depend on and affect coral reefs in other countries. Ocean currents carry not only essential larvae and juvenile corals, fish, and other invertebrates that replenish reefs but also potentially harmful pollutants and diseases. Thus, strategies for supporting healthy coral reef ecosystems in the United States must also consider protecting coral reefs beyond U.S. waters.

NOAA's Coral Reef Conservation Program (CRCP) was established in 2000 to help fulfill NOAA's responsibilities under the Coral Reef Conservation Act (CRCA) and Presidential Executive Order 13089 on Coral Reef Protection. The mission of the CRCP is to protect, conserve, and restore coral reef resources by maintaining healthy ecosystem function. Since 2001 the CRCP has supported a variety of international initiatives to build human and institutional capacity to support integrated coastal management, protected area management, reduction of land-based sources of pollution, and sustainable fisheries in coral reef nations.

To make the most of limited resources and to have the largest impact to reverse general declines in coral reef health, the CRCP is narrowing the focus of its U.S. domestic program and shifting allocation of CRCP resources to taking on-the-ground and in-the-water action. To narrow its range of activities, the CRCP will emphasize efforts to understand and address the top three recognized global threats to coral reef ecosystems: climate change impacts, fishing impacts, and impacts from land-based sources of pollution (summarized in a separate document titled *NOAA Coral Reef Conservation Program Goals & Objectives 2010-2015*).

This Coral Reef Conservation Program International Strategy (International Strategy) is intended to strengthen and expand the Program's international coral reef conservation efforts by providing twenty-year strategic goals and five-year objectives that the CRCP will work to address to effectively reduce international threats to coral reefs. The CRCP is committed to refining its performance and efficiency measures to reflect the new program direction and better evaluate overall CRCP performance, placing greater emphasis on outcomes rather than outputs.

The International Strategy is designed to bring more focus to the CRCP's international activities on topics and regions where the Program can have the greatest impact by building on NOAA's strengths, building partnerships and leveraging resources and expertise. The International Strategy's major focus will be to support activities related to marine protected area (MPA) capacity building in four key international regions. Depending on the availability of funds, through implementation of this International Strategy, the CRCP will:

- Work with regional initiatives to build MPA networks and strengthen local management capacity to improve and maintain resilience of coral reef ecosystems and the human communities that depend on them;
- Develop and implement tools and practices to more effectively observe, predict, communicate, and manage climate change impacts in priority international locations;
- Strengthen local and national capacity and policy frameworks to reduce impacts of fishing on coral reef ecosystems; and
- Strengthen policy frameworks and institutional capacities to reduce impacts to coral reef ecosystems from pollution due to land-based activities.

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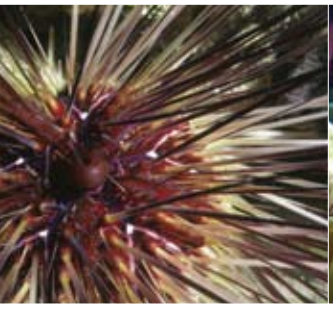


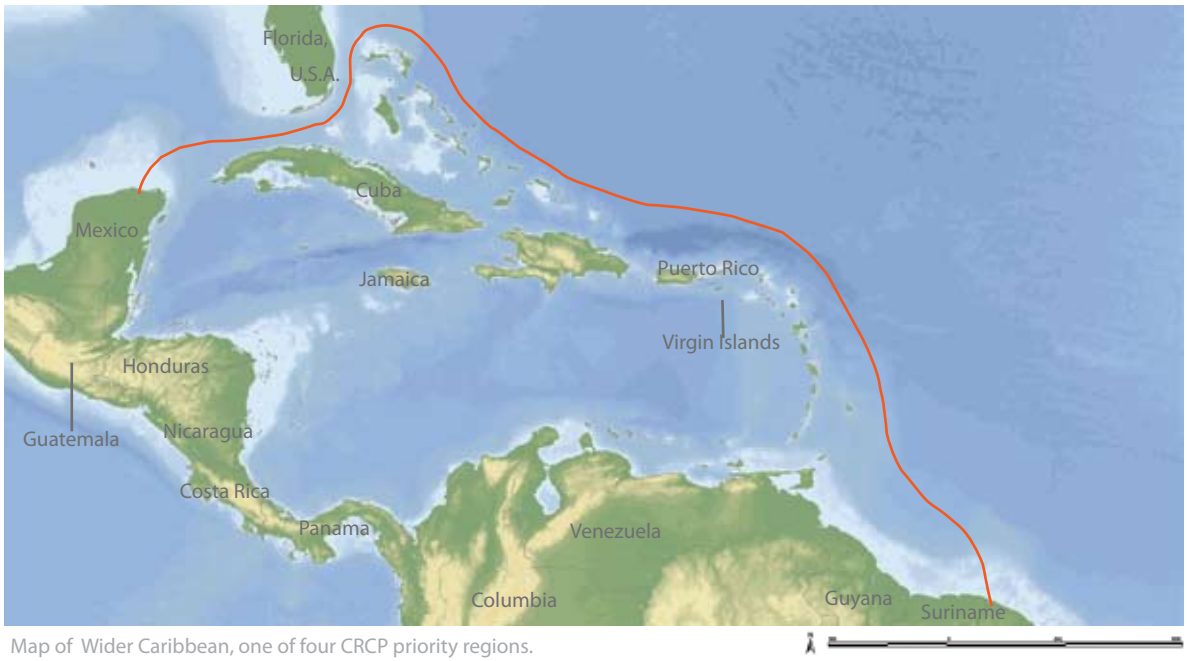


Priority Regions

The NOAA CRCP International Strategy will focus on supporting existing regional efforts in four priority regions based on their interconnections with U.S. reef ecosystems and existing initiatives and partnerships: the Caribbean, Micronesia, Southwest Pacific (with a focus on Samoa), and the Coral Triangle.

Wider Caribbean

The wider Caribbean region, as defined by the Cartagena Convention, comprises the marine environment of the Gulf of Mexico, Caribbean Sea and adjacent areas of the Atlantic Ocean south of 30 degrees north latitude. The region includes 24 independent countries and overseas territories of four developed nations (listed at: http://www.unep.org/regionalseas/programmes/unpro/caribbean/countries.asp) and is home to approximately seven percent of the world's shallow coral reefs. The Caribbean is relatively small and is surrounded by multiple drainage areas that support large human populations, thus



Map of Wider Caribbean, one of four CRCP priority regions.

Photo Credits: Far left: Emma Hickerson; Left: D. Paul Brown; Middle: Mark Eakin; Right: Mark Eakin; Far right partial: Andy Bruckner/NOAA NMFS; Map: ReefBase (http://www.reefbase.org)

coral reef ecosystems in the region are particularly vulnerable to human impacts.

The Caribbean is referred to as the 'Third Border' of the United States and is critically important to the nation's environment, economy and national security. Coral reefs in U.S. waters of the Gulf of Mexico, Florida, Puerto Rico and the U.S. Virgin Islands are closely connected with reef communities of the Yucatan Peninsula, Greater Antilles and Eastern Caribbean. The World Resources Institute *Reefs at Risk in the Caribbean* report estimated that in 2000 Caribbean coral reef resources provided between $3.1 and $4.6 billion per year from fisheries, shoreline protection and tourism services. According to the Caribbean Tourism Organization, the region receives over 20 million visitors each year, including over seven million from the United States.

In recent decades coral reef communities throughout the Caribbean have experienced major declines, suffering from a series of large scale impacts, including mass coral bleaching events, infectious disease outbreaks and substantial die-offs of important species, such as the long-spined sea urchin (*Diadema antillarum*) and staghorn and elkhorn corals (*Acropora cervicornis and A. palmata*). As a result, many reefs in the region have lost as much as 80% of their historical coral cover. The recent introduction of invasive species to the region, in particular, red lionfish (*Pterois volitans*) are also an emerging concern. According to the Reefs at Risk Threat Index, nearly two-thirds of the Caribbean's coral reefs are threatened by human activities, including coastal development, land-based sediments and pollution, vessel discharges and unsustainable fishing.

Micronesia

The Pacific is a vast region and is among the most diverse and important coral reef areas in the world. The Micronesia region in particular has some of the world's highest marine biodiversity and is home to 60% of the known coral species. However, four main threats in the form of climate change, unsustainable fishing, pollution, and habitat destruction are impacting the region's coral reefs.

The Micronesia region includes three independent countries under compacts of free association with the United States: the Republic of the Marshall Islands; the Republic of Palau; and the Federated States of Micronesia as well as the independent nations of Kiribati and Nauru. There are also two U.S. jurisdictions in the region, the Territory of Guam and the Commonwealth of the Northern Mariana Islands. Geographic proximity of the Micronesian countries to the U.S. territories underlies the need to protect coral reefs in international Micronesian locations. These independent islands share a common environmental initiative with U.S. jurisdictions:

Map of Micronesia, one of four CRCP priority regions.

Photo Credits: Left partial: Andy Bruckner/NOAA NMFS; Right: Miles Anderson; Map: ReefBase (http://www.reefbase.org)

the locally-led Micronesia Challenge, which sets long-term ecological goals and establishes mechanisms to achieve them. The Micronesia Challenge brings together national and local governments, non-governmental organizations (NGOs), and communities active in the region, and has been recognized internationally as a model of environmental stewardship.

Samoa and the Southwest Pacific

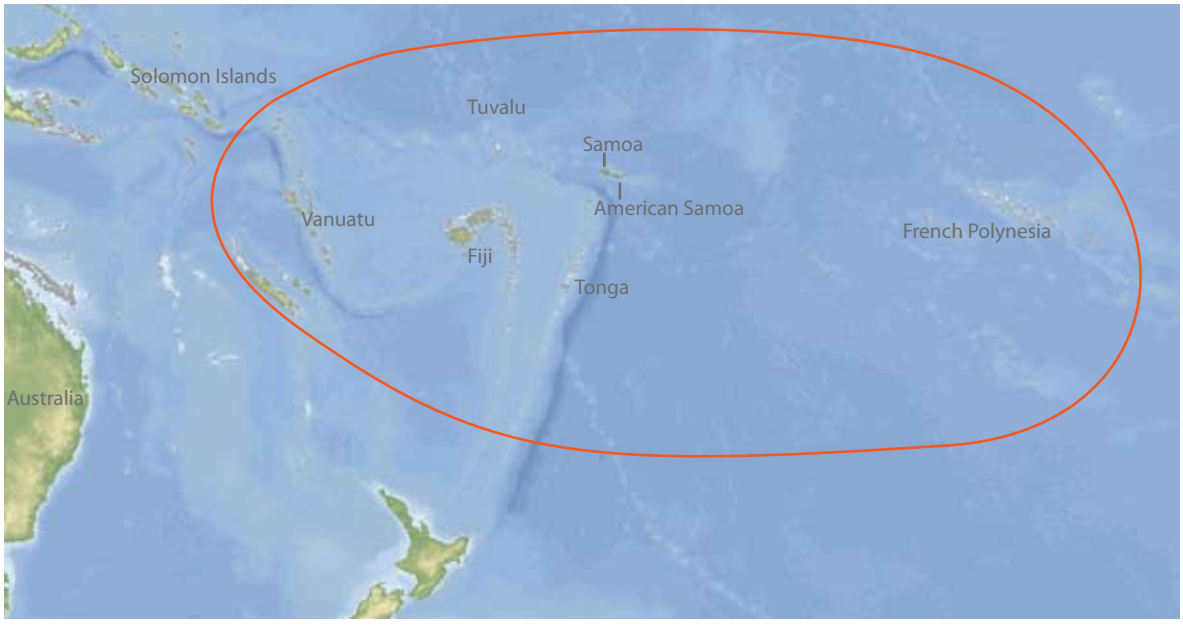
The Southwest Pacific is a biologically diverse region lying directly south of Micronesia. Within this region, the CRCP will support coral reef conservation efforts that build on synergies with the national CRCP priorities and promote basin-wide collaboration. A priority focus will be independent Samoa, which shares cultural, geographical and biological links to American Samoa, located just 73 miles away. The leaders of Samoa and American Samoa have initiated the Two Samoas Initiative to bring together local and regional environmental agencies and organizations to promote efficient management for addressing shared marine and terrestrial environmental concerns. The Initiative also aims to increase the cooperation between the two neighboring islands and is among the regional projects that the CRCP can support as a primary vehicle for coral reef conservation within the wider region.

Elsewhere in this region, and depending on available resources and opportunities for potential collaboration, the CRCP will also consider supporting coral reef conservation activities in the independent states of Fiji, Vanuatu, Tonga, and Tuvalu and will collaborate with other states and territories as appropriate.

Coral Triangle

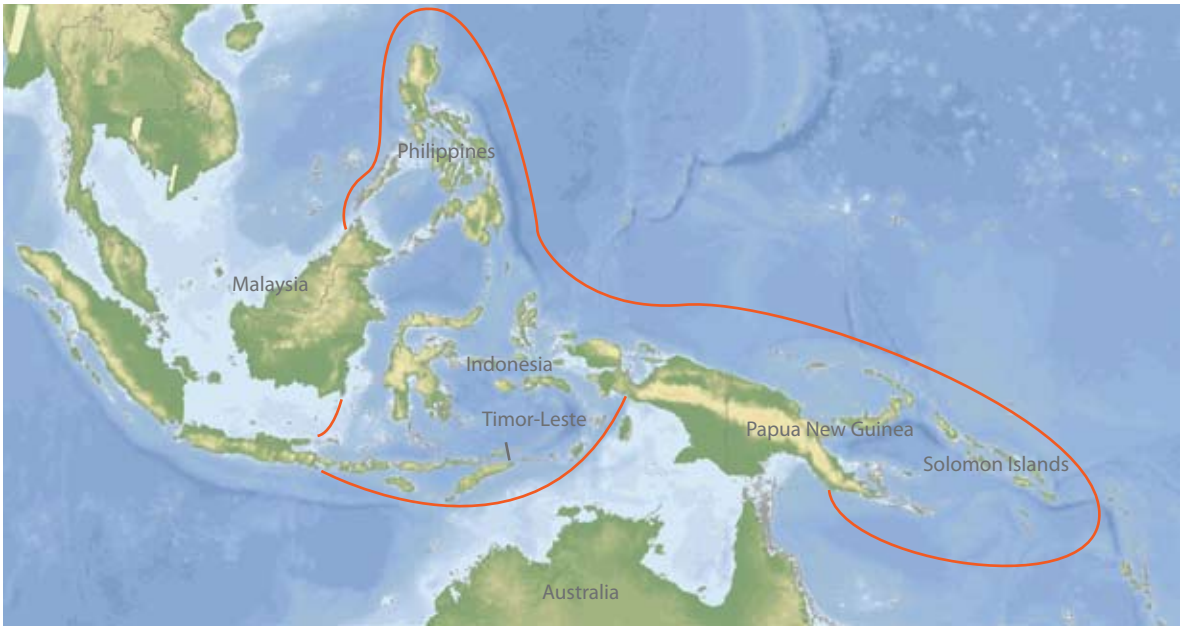
The Coral Triangle (CT) is the region with the highest diversity of corals and reef fish on the planet. Located along the equator at the confluence of the Western Pacific and Indian Oceans, the CT includes all or part of the exclusive economic zones of six countries: Indonesia, Malaysia, Papua New Guinea, the Philippines, the Solomon Islands and Timor-Leste. Covering only 1.6% of the planet's oceanic area, it includes over one-third of the world's coral reefs, the greatest extent of mangroves in the world, and the spawning and nursery areas for one of the world's largest tuna fisheries

These marine and coastal living resources provide important benefits to over 360 million people who reside in the region, along with benefits to many millions more outside the region. One-third of the inhabitants within the CT itself – more than 120 million people, particularly those living in coastal communities – depend directly on local marine and coastal resources for their income, livelihoods, and food security. These



Map of Southwest Pacific, one of four CRCP priority regions.

Photo Credit: Dave Burdick; Map: ReefBase (http://www.reefbase.org)



Map of the Coral Triangle, one of four CRCP priority regions.

valuable marine resources are under significant and increasing threat from a variety of pressures including: climate change, unsustainable fishing practices including use of poison and blast fishing, land-based sources of pollution, over-extraction of coral, and coastal habitat degradation. Additional action is needed at many levels to reduce these pressures and sustain resilient ecosystems for current and future generations.

The CT is the focus of an international effort among government and non-governmental partners called The Coral Triangle Initiative: Coral Reefs, Fisheries and Food Security (CTI) to help sustain the region's precious marine resources and the people, communities and economies that depend on them. The United States government is a formal partner in the CTI and is committed to help support implementation of CTI by the six CT nations. As part of the U.S. government support for CTI, NOAA and NOAA's CRCP have made the CT a priority focus area and are building on existing efforts in the region.

Photo Credit: Dave Burdick; Map: ReefBase (http://www.reefbase.org)

Other Geographic Areas

The CRCP will also continue supporting successful partnerships in geographical areas outside of the priority areas outlined above. While the priority geographic regions will receive the bulk of funding and other assistance from the CRCP, outstanding projects may be supported in other areas.

Global Leadership

The CRCP recognizes that the United States is only one center for coral reef research and conservation. The Program is committed to learning from the efforts of other entities, including regional initiatives, national governments, NGOs, and scientific organizations to further its domestic mission to protect U.S. coral reefs. The CRCP will continue to engage in international collaborative research to improve science and management for coral reefs around the world, including supporting efforts to standardize tools and methods used in coral reef monitoring and management and will address emerging issues as appropriate. The CRCP will also continue to support international governance and reporting efforts, such as the International Coral Reef Initiative and the Global Coral Reef Monitoring Network.

And Atoll Biosphere Reserve, Pohnpei, Micronesia.
Photo Credit: Eugene Joseph




FY 2010-2015 International Goals and Objectives

1 Priority Goal

Work with regional initiatives to build MPA networks and strengthen local management capacity to improve and maintain resilience of coral reef ecosystems and the human communities that depend on them.

The CRCP domestic coral reef conservation strategy focuses on the top three global threats to coral reefs: climate change impacts, fishing impacts, and impacts from land-based sources of pollution. These threats are addressed more specifically in this document by Goals 2, 3 and 4, while priority Goal 1 focuses on supporting MPAs. Although MPAs cannot fully protect corals from stressors that stem from beyond their boundaries, experience has shown that – when combined with other management strategies, such as integrated coastal management and ecosystem-based fisheries management – appropriately placed and well-managed MPAs are effective tools to protect and restore coral reef ecosystems. MPAs also embody vital management strategies to improve and maintain resilience of coral reef ecosystems in the face of a changing climate. MPAs and MPA networks are now being designed, implemented and evaluated in coral reef ecosystems around the world at local, national and regional levels. Supporting these efforts is the top priority of this International Strategy.

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The intent of this goal is to build well-designed and effectively managed MPAs and MPA networks by strengthening capacity to design and implement MPAs at regional to local levels. To achieve this goal, the objectives focus on building capacity in the key areas necessary for successful design, implementation, monitoring and evaluation of MPAs and MPA networks in coral reef ecosystems. In addition, this goal promotes science-based tools and MPA network principles, including connectivity, representativeness, protection of spawning aggregations, biodiversity, livelihood impacts, and resilience to climate change.

The objectives below outline activities the CRCP will support to build MPA capacity in priority international regions. The first two objectives focus on long-term capacity building for MPA practitioners while the following three objectives focus on meeting enforcement, financial, and scientific needs. Most of the objectives are focused on improving management of existing MPAs, which is prioritized over identifying new MPA sites.

Objective I1.1: Work with regionally-based social networks of MPA practitioners to undertake capacity assessments that will form the basis of future CRCP support.

Objective I1.2: Develop and implement comprehensive long-term capacity building programs for existing MPAs, based on capacity assessments to provide training, technical assistance, and follow-up support specifically for:

a. management planning and effectiveness evaluations;
b. community engagement program development;
c. integrated biophysical and socioeconomic monitoring linked to site management goals, including data analysis and interpretation;
d. use of climate change tools and crisis response planning; and
e. other topics as needed.

Objective I1.3: Increase local enforcement capacity to improve compliance with MPA regulations and conservation-oriented customary practices.

Objective I1.4: Support the development of sustainable finance tools and site implementation of sustainable finance plans to ensure long-term support for conservation efforts.

Objective I1.5: Use regionally appropriate biophysical and socioeconomic monitoring and evaluation protocols to:

a. establish baselines and detect changes over time in an adaptive management framework; and
b. identify priority sites for conservation and assess community support for designation of new MPAs and MPA networks.

While the CRCP will focus its international work on capacity building for MPA management as described in Goal 1, the following three goals remain a priority for the Program.

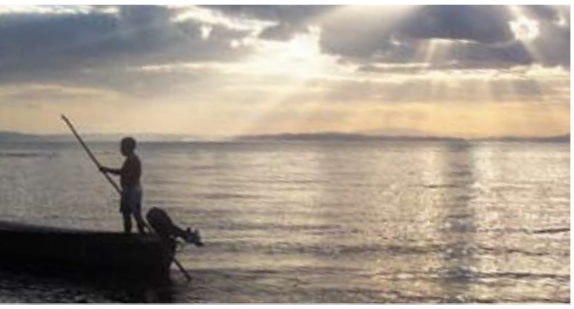
GOAL 2

Develop and implement tools and practices to more effectively observe, predict, communicate, and manage climate change impacts in priority international locations

Human activities are changing the world's climate. Increasing ocean temperatures and ocean acidification are already affecting reefs by bringing more frequent mass coral bleaching events and slowing the formation of coral skeletons and crustose coralline algae at some coral reef locations. Under some scenarios, the next century

of climate stress could even lead to the loss of most corals, severely stressing the biological and human communities that depend on them. While the only long-term solution is to stabilize greenhouse gases in the atmosphere by reducing emissions, that task lies beyond NOAA's mandate and outside the control of coral reef managers.

The intent of this goal is to identify some key actions that can be taken to help promote the resilience of coral reef ecosystems.



Effective action requires sound science. Research and monitoring are still needed to understand and reduce impacts in some key areas. The first two activities are aimed at fostering the international collaborations that will advance science to inform management. These research and monitoring activities are especially critical with regard to the emerging issue of ocean acidification, which may have profound impacts on coral reef ecosystems around the world. Outreach and capacity building are also key activities that NOAA will seek to foster internationally through the development of case studies and training programs.

Objective I2.1: Collaborate with global partners to broaden the international delivery of coral bleaching prediction and warning tools and improve the science and technology for predicting climate impacts on global coral reef ecosystems.

Objective I2.2: Expand observing networks to identify and monitor priority coral reef areas that are especially resilient or vulnerable to climate change.

Objective I2.3: Develop international case studies on impacts of climate change and ocean acidification in order to encourage global greenhouse gas reductions and to encourage greater incorporation of climate change impacts on coral reefs into future global assessments.

Objective I2.4: Build local capacity to test, implement and evaluate management strategies to respond to climate change impacts.

GOAL 3

Strengthen local and national capacity and policy frameworks to reduce impacts of fishing on coral reef ecosystems

Coral reef fisheries play an important role in sustaining communities around the globe by supporting livelihoods and providing food security. Unsustainable fishing practices have profound, far-reaching ecosystem consequences in terms of biodiversity loss, habitat degradation, and diminished ecosystem function and productivity. These consequences are detrimental to the social viability of local communities. Cooperative international approaches to fisheries management provide the best opportunity to ensure that coral reef fisheries continue to play their vital role. NOAA's active engagement with the international community enables the United States to contribute to and learn from the global lessons of science and management experience.

The intent of this goal is to address unsustainable coral reef fishery practices by promoting fisheries management tools that can be used in conjunction with marine protected areas. The goal specifies actions to: improve national and regional fisheries governance and regulations; promote local community participation in monitoring and enforcement; and respond to impacts resulting from the international trade of coral reef-based species. Local fisher participation and the use of traditional knowledge are important elements of this goal.

Objective I3.1: Provide support and technical assistance to strengthen fisheries policy, governance and regulatory measures at national and regional levels to foster an ecosystem-based approach to fisheries management.

Objective I3.2: Facilitate local cooperative enforcement partnerships and socioeconomic monitoring to address community concerns and to assess and improve compliance with sustainable fishing regulations and customary practices.

Objective I3.3: Assess the U.S. role in the international trade of coral reef-based ornamental, food and curio species, evaluate U.S. and international legal mechanisms to assess trade impacts and work with exporting countries to adopt sustainable and responsible harvesting measures.

GOAL 4

Strengthen policy frameworks and institutional capacities to reduce impacts to coral reef ecosystems from pollution due to land-based activities

Up to 80% of pollutants entering the ocean originate from land-based sources, including municipal, industrial, and agricultural activities. Such pollutants, including fertilizers, pesticides, metals, sewage effluents, and sediment runoff, pose a significant threat to coral reefs around the globe. Excessive nutrients from fertilizers and sewage encourage the growth of non-calcifying algae that can smother corals or outcompete them for space. Increased sedimentation from coastal development activities, such as dredging and shoreline modifications, and upstream agricultural and deforestation activities can smother coral, block respiration and photosynthesis, and reduce suitable substrata for colonization.

The intent of this goal is to facilitate integrated coastal management mechanisms to address land-based pollution threats to coral reefs in targeted coastal watersheds either in the absence of or in conjunction with MPA strategies outlined in Goal 1. The goal outlines a set of actions to identify threatened coral reef habitats, access adjacent pollution sources, and enhance the capacity of coastal planners and decision makers to respond to land-based threats in targeted coastal watersheds.

Objective I4.1: Support national-level and regional initiatives to identify priority coral reef areas threatened by pollutants and assess pollutant sources to those areas.

Objective I4.2: Collaborate with U.S., regional and local partners to develop and implement coastal and watershed management plans to reduce land-based pollution.

Objective I4.3: Support national-level and regional initiatives to determine gaps in policy and legislation preventing the effective management of land-based pollutants.

Orangefin anemonefish (*Amphiprion chrysopterus*) hiding in a the lavender-tipped tentacles of the anemone, *Heteractis crispa*, at Gun Beach in the Tumon Bay Marine Preserve, Guam.

Photo Credit: Dave Burdick

Definitions

Climate Change: Any change in the ocean-atmosphere climate system over time, whether due to natural variability or human activity.

Coral Triangle Region: Geographic area of the Pacific Ocean that includes all or part of the exclusive economic zones of six countries: Indonesia, Malaysia, Papua New Guinea, the Philippines, the Solomon Islands and Timor-Leste.

Marine Protected Area: Any area of the marine environment that has been reserved by federal, state, territorial, tribal, or local laws or regulations to provide lasting protection for part or all of the natural and cultural resources therein.

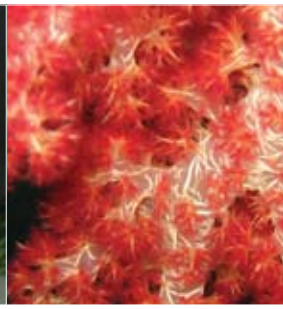
Marine Protected Area Network: A set of discrete MPAs within a region or ecosystem that are connected through complementary purposes and synergistic protections. A network of MPAs could focus on ecosystem processes, certain individual marine species, or cultural resources. For example, an ecological network of MPAs could be connected through dispersal of reproductive stages or movement of juveniles and adults.

Micronesia Region: Geographic area of the Pacific Ocean that includes three independent countries under compacts of free association with the United States: the Republic of the Marshall Islands; Republic of Palau; and Federated States of Micronesia as well as the independent nations of Kiribati and Nauru. Also found in the Micronesia region are two U.S. jurisdictions, the Territory of Guam and the Commonwealth of the Northern Mariana Islands.

Ocean Acidification: A measurable reduction in ocean pH caused by increased concentrations of CO_2 in seawater. One result is a reduction in the availability of carbonate ions that marine organisms use to build shells and skeletal structures.

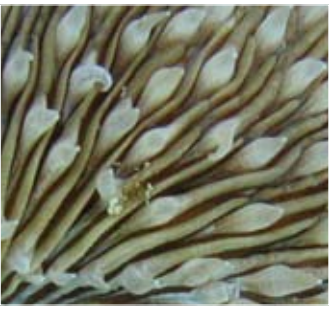
Resilience: The capacity of a system to absorb stresses and continue functioning (Levin and Lubchenco 2008).

Southwest Pacific Region: Geographic area of the Pacific Ocean located directly south of Micronesia. Independent nations in this region include Fiji, Samoa, Tonga, Tuvalu, and Vanuatu. The U.S. territory of American Samoa is also found in this region.



Spawning Aggregation: A spawning aggregation occurs when a large number of fish come together temporarily at specific sites to reproduce. Spawning aggregations may be the primary source of larvae that replenish local fishery populations.

Wider Caribbean Region: The wider Caribbean region, as defined by the Cartagena Convention, comprises the marine environment of the Gulf of Mexico, Caribbean Sea and adjacent areas of the Atlantic Ocean south of 30 degrees north latitude. The region includes 24 independent countries and overseas territories of four developed nations (http://www.unep.org/regionalseas/programmes/unpro/caribbean/countries.asp).



Isopora cuneata with *Paracirrhites forsteri* in camouflage, Republic of the Marshall Islands.

Photo Credit: Jim Maragos





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